

# **Summary of U.S. fisheries for Highly Migratory Species in the Western-Central Pacific Ocean, 1999-2003<sup>1</sup>**

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### **INTRODUCTION**

This report summarizes annual catches, fishing effort, and size composition for U.S. fisheries that harvest highly migratory species (HMS) in the western-central Pacific Ocean (WCPO) for the 5-year period of 1999-2003. These fisheries range from small-scale troll, handline, and pole-and-line fisheries operating in nearshore waters, to large-scale purse seine, longline, and distant-water troll fisheries operating on the high seas. Tunas (Scombridae; Tribe Thunnini), swordfish (*Xiphias gladius*), and marlins (Istiophoridae) are the principal species harvested.

### **FISHERIES**

#### **U.S. WCPO Fisheries**

The 5 U.S. fisheries for HMS are the purse seine fishery that targets skipjack (*Katsuwonus pelamis*) and yellowfin tuna (*Thunnus albacares*), while also catching bigeye tuna (*Thunnus obesus*); the longline fishery fishing for large tunas and swordfish; the distant-water troll fishery targeting albacore (*Thunnus alalunga*); the troll and handline fishery harvesting a variety of tunas, marlins, and other pelagic species; and the pole-and-line fishery for skipjack tuna. Total catch from these fisheries was 106,461 metric tons (t) in 2003 (Table 1), a decrease of 24% from the previous year and the lowest catch observed in the 5-year period. Catches of HMS by all U.S. fisheries, except for the pole-and-line fishery, decreased in 2003. The purse seine fishery accounted for 83% of the total catch in 2003 while the longline fishery contributed 14%. The distant-water troll, troll and handline, and pole-and-line fisheries made up the remainder. The purse-seine fishery was responsible for most of the overall decline.

The total catch in 2003 consisted predominantly of skipjack tuna (61%), yellowfin tuna (23%), and bigeye tuna (6%) (Table 2). The lower total catch in 2003 is primarily due to lower catches of skipjack tuna, which dropped 27% from the previous year. Catches of yellowfin tuna, bigeye tuna, and albacore also decreased in 2003, while catches of marlin, swordfish, and other pelagic species increased.

## **Purse Seine Fishery**

In the WCPO, NMFS collaborates with the Forum Fisheries Agency (FFA) to monitor the U.S. purse seine fishery using logbooks, cannery landings receipts, observers, and port sampling. Mandatory logbooks contain details on set-level fishing effort, catches by species, fishing location, and other data. Port samplers collect data on size, species composition, and other biological data.

The U.S. purse seine fleet decreased from 29 vessels in 2002 to 26 vessels in calendar year 2003 (Table 3). The total catch was 87,994 t, representing the lowest catch since the fishery began fishing under the “Tuna Treaty”<sup>1</sup> in 1988. The purse seine catch was composed of skipjack tuna (72%), yellowfin tuna (25%), and bigeye tuna (3%).

The return of non-El Niño oceanographic conditions in 2003 moved the fleet’s fishing effort farther west than in 2002 and concentrated it mainly in areas around the Federated States of Micronesia, Papua New Guinea, Nauru, and the Solomon Islands (Fig. 1). This shift of fishing areas to the west also resulted in a decrease in effort on free-swimming schools (44% in 2003, down from 64% in 2002) and a higher percentage of effort on log sets (24% in 2003, up from 3% in 2002) (Fig. 2). The proportion of FAD<sup>2</sup> sets remained about the same as the previous year (32% in 2003). Along with the operational changes, overall catch rates increased from 22 t per day fished in 2002 to 29 t per day fished in 2003.

The U.S. purse seine fleet delivered 89% of its catch to canneries in the Territory of American Samoa (American Samoa) in 2003. The remainder of the catch was off-loaded in Thailand (9%) and in Papua New Guinea and Colombia (2%).

Fork length (FL) measurements were collected for skipjack tuna ( $n = 14,627$ ), yellowfin tuna ( $n = 22,933$ ), and bigeye tuna ( $n = 8,537$ ) as the U.S. purse seine fleet off-loaded in American Samoa in 2003 (Fig. 3). The length-frequency distribution of skipjack tuna had one dominant mode at the 46-50-cm interval. The dominant mode for both yellowfin and bigeye tuna occurred at the 56-60-cm interval; however, the yellowfin tuna distribution showed a greater proportion of larger fish.

## **Longline Fisheries**

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<sup>1</sup> Treaty on fisheries between the Governments of certain Pacific Island States and the Government of the United States of America.

<sup>2</sup> A Fish Aggregating Device (FAD) is usually a raft set adrift with an attached location device.

Data for monitoring U.S. longline fisheries are collected using mandatory federal logbooks submitted to NMFS by longline vessel captains; federal, state, and territorial port sampling; and reports of fish landed and sold to wholesale fish dealers. The logbooks contain information on daily nominal fishing effort (number of hooks set), time and geographic location of fishing, details of the fishing gear used, and the number of fish and protected species caught by species. Port sampling and fish dealer reports provide data on the size composition of landed catch for major fish species. The total annual longline fish catch by species is computed by combining the number of fish caught from the logbook data with estimates of mean landed weight.

There were 178 U.S. longline vessels fishing in the WCPO in 2003 (Table 4a), with 72% fishing exclusively in the North Pacific and the remainder exclusively in the South Pacific. Total longline catch was 14,726 t; down 9% from the previous year. The fleets based in California and Hawaii accounted for 66% of the total U.S. longline catch in the WCPO, while the American Samoa longline fishery made up the remaining catch. The largest components of the catch were albacore (30%), bigeye tuna, (26%), swordfish (13%), and yellowfin tuna (9%).

The Hawaii-based longline fishery directed effort exclusively towards large tunas (bigeye tuna, yellowfin tuna, and albacore) while the California-based longline fishery primarily targeted swordfish for the past 3 years. Both fisheries sold their catches to the fresh fish market. The longline fleet in American Samoa targeted albacore and sold virtually all its albacore catch and much of their bigeye and yellowfin tuna catch to the canneries. Other incidentally caught pelagic species were sold to local fresh fish markets or given to crewmembers, families, or friends.

The total number of vessels (129) in the California- and Hawaii-based longline fisheries remained about the same as in 2003. Five times as many vessels were active exclusively in the Hawaii-based longline fishery (107) than in the California-based longline fishery (19) with three vessels active in both fisheries. The Hawaii longline fleet made more than three times as many trips per vessel in 2003 than the California fleet, for a total of 1,215 trips and 80 trips, respectively. California- and Hawaii-based longline operations occurred in the North Pacific (Fig. 4a) from the equator to 45°N and between 125°W and 175°W. There was a high level of effort east of Johnston Atoll and moderate effort near the main Hawaiian Islands.

The total catch of the California- and Hawaii-based longline fisheries was 9,681 t in 2003 (Table 4a). Bigeye tuna was the largest component of the catch (38%) followed by swordfish (20%), and yellowfin tuna (8%). The total catch by these fisheries increased 6% in 2003. Although the bigeye tuna catch was down 18% in 2003, there were increases in the catches of several other pelagic species. Many of the California-based longline vessels were formerly based in Hawaii and targeted swordfish. Nevertheless, total swordfish catches from both fisheries since 2001 have been less than half the annual catch in 1999 and 2000 when targeting swordfish was still allowed in Hawaii.

Almost all of the Hawaii-based longline catch is sold at a single public fish auction in Honolulu. Much of the catch is typically sold whole, but landed weights of fish that were processed (e.g., gilled and gutted) were raised to an estimated whole weight. The auction data

were used to produce weight frequency histograms for the Hawaii-based longline catch (Figs. 5a and 5b).

Weight measurements from the Hawaii-based longline catch were obtained for 98,955 bigeye tuna, 26,563 yellowfin tuna, 20,254 albacore, and 2,036 swordfish. The bigeye tuna weight frequency had two modes: the 21-22-kg and 39-40-kg intervals. The yellowfin tuna weight frequency also had a bimodal distribution with a dominant mode of large fish between the 35-36-kg and 39-40-kg intervals and a smaller mode between the 5-6-kg and 9-10-kg intervals. The weight frequency distribution of albacore was a prominent mode of large fish between the 24-25-kg and 29-30-kg intervals and a smaller mode at the 19-20-kg interval. The swordfish catch in 2003 showed the higher frequency of fish in the 1-10-kg interval with the frequency of larger fish tapering off. This swordfish size distribution is typical of a longline fishery targeting tuna. Size data are not available for the California-based fishery.

The longline fishery in American Samoa is composed of small aluminum-hulled catamarans (*alias*) equipped with hand crank reels and larger monohull vessels using hydraulic powered reels. The number of vessels increased dramatically from 25 vessels in 1998, peaked at 62 vessels in 2001, then declined to 49 vessels in 2003 (Table 4a).

American Samoa longline catches increased dramatically from 517 t in 1999 to 7,112 t in 2002, then decreased to 5,045 t in 2003. The catch in 2003 was composed primarily of albacore (78%) with smaller quantities of yellowfin tuna (10%), bigeye tuna (5%), and wahoo (*Acanthocybium solandri*) (4%).

Length measurements of albacore were collected as longline vessels unloaded in American Samoa. The length frequency distribution of albacore ( $n = 11,731$ ) was broad with 78% of the fish between 90 cm and 99 cm (Fig. 6). The length frequency distribution of yellowfin tuna peaked at the 76-80-cm interval but was spread out across a wide range ( $n = 1,471$ ).

U.S. monitoring programs also include research to improve the accuracy of catch statistics. In the Hawaii longline fishery, most species caught are correctly identified by fishermen so that catch data recorded in logbooks are generally accurate. Extensive studies comparing logbook data with observer data and landings records have shown that the highest accuracy is associated with the principal fish species of high commercial value, such as the target species of tuna or swordfish (Walsh, 2000). Research is underway at the PIFSC with support from the Pelagic Fisheries Research Program (NOAA-University of Hawaii Joint Institute of Marine and Atmospheric Research) to identify and resolve important inaccuracies in logbook reporting. These studies have shown that marlins are often misidentified. The most frequent mistake is the reporting of striped marlin as blue marlin. Statistical procedures for estimating corrected Hawaii longline catch histories for blue marlin and striped marlin have been developed (Walsh, in review) and indicate that the annual blue marlin catch was over-reported in logbooks by as much as 63% during 1999-2001 (Table 4b).

### **Distant-water Troll Fishery for Albacore**

NMFS monitors U.S. distant-water albacore vessels using mandatory logbooks, cannery receipts and landings records, port sampling, and occasional observers. Logbooks provide daily effort and catch data along with geographic location, sea surface temperature, and other details. Port samplers and at-sea observers collect length frequency data and other biological data.

The distant-water troll fishery for albacore in the South Pacific primarily involved vessels based in California, Oregon, and Washington. The season for this fishery begins in December and lasts through March. The number of vessels fishing increased 17% from 12 in the 2001-2002 season to 14 in the 2002-2003 season. Catches decreased slightly from 1,218 t in the 2001-2002 season to 1,205 t in the 2002-2003 season (Table 5). The main fishing area ranged between latitudes of 35°S to 45°S and longitudes of 120°W to 180° for the 2002-2003 season (Fig. 7).

Albacore fork-length measurements were collected at the canneries in American Samoa. A total of 1,229 albacore were measured during the 2002-2003 season. The length-frequency distribution shows 67% of the fish caught were between 63 cm and 80 cm (Fig. 8).

### **Troll and Handline Fishery**

Small-scale and artisanal troll and handline fisheries operate in Hawaii, American Samoa, the Territory of Guam (Guam), and the Commonwealth of the Northern Mariana Islands (Northern Marianas). The fishery is composed of relatively small vessels with the total number estimated at 2,114 in 2003. The Hawaii-based fishery accounted for 83% of the troll and handline catch with Guam, Northern Marianas, and American Samoa making up the remainder (Table 6). Troll and handline catches decreased 19% to 2,098 t in 2003. The catch was predominantly yellowfin tuna (34%), mahimahi (*Coryphaena hippurus*) (16%), skipjack tuna (12%), and wahoo (12%). Yellowfin tuna dominates the Hawaii troll and handline catch, whereas skipjack tuna is the largest component of the troll and handline catch elsewhere. Catches are sold mainly at local fresh fish markets.

The weight frequency distributions for skipjack tuna and yellowfin tuna from Hawaii troll and handline fisheries are shown in Figure 9. Weight measurements were obtained for yellowfin tuna ( $n = 35,058$ ) and skipjack tuna ( $n = 31,584$ ) from the public fish auction in Honolulu. The yellowfin tuna weight frequency showed dominant mode of the fish in the 1-2-kg interval that accounted for 31% of the catch. The skipjack tuna weight frequency distribution peaked at the 2-3-kg interval and represented 41% of the catch.

### **Pole-and-line Fishery**

The pole-and-line fishery is based in Hawaii and operates exclusively within the Hawaii EEZ. These vessels catch small live baitfish for chum to attract and hold feeding schools of tuna. Six pole-and-line vessels caught 459 t in 2003, up 50% from the previous year (Table 7). Catches were predominately skipjack tuna along with small quantities of yellowfin tuna that were sold to local fish markets. Catches are monitored using State of Hawaii commercial fishery reports. No size measurements were collected for this fishery.

## **BYCATCH**

Bycatch is defined here as reported catches discarded at sea. Fish bycatch was summarized from logbook data for the U.S. distant-water purse seine fishery, the California- and Hawaii-based longline fisheries, and the American Samoa longline fishery.

Total purse seine fish bycatch was 889 t in 2003 and consisted primarily of discards of target species that were small in size (Table 8). The logbook data listed 746 t of tunas, most of which was skipjack tuna with a smaller amount of yellowfin tuna and a mix of skipjack and yellowfin tuna. The total for other purse seine bycatch was 143 t and was composed primarily of other fin fish species, billfish, sharks and rays.

In the longline fisheries, the tuna bycatch rate in the combined California and Hawaii longline fishery (9%) was higher than in the American Samoa longline fishery (5%). However, bycatch rates for non-tuna species were significantly higher in the American Samoa fishery (Table 9a). High catches of albacore, limited hold space, and lack of markets for other pelagic species were the primary reasons for the high rates of discards in this fishery.

The total fish bycatch rate in the California- and Hawaii-based longline fishery was 21% in 2003, with blue shark comprising 67% of this total (Table 9a). Tunas were the second largest component of the bycatch at 18%, followed by billfish (5%). The total bycatch rate for the American Samoa longline fishery was 12% in 2003. The discards consisted primarily of miscellaneous pelagic fish such as oilfish, mahimahi, and wahoo (9%), followed by tuna (33%), and sharks (24%).

In the Hawaii-based longline fishery, reported logbook statistics on the bycatch (incidental “take”) of sea turtles, seabirds, and marine mammals often substantially understate the actual level of interactions with these species. The same is likely true for other U.S. longline fisheries. In the case of the Hawaii fishery, however, rigorous statistical methods have been developed to provide more reliable take estimates of protected species. Table 9b gives estimates for the year 2003. These were computed by applying a Horvitz-Thompson estimator to data collected by NMFS-contracted observers deployed on sampled longline trips, fishing effort of the longline fleet as reported in logbooks, and other information (Marti McCracken, NMFS Pacific Islands Fisheries Science Center, unpublished).

## **DEVELOPMENTS IN 2004**

The U.S. distant-water purse seine fishery in 2004 is expected to be very similar to the 2003 fishery unless El Niño conditions return to the WCPO. Should this occur, the fleet might fish farther east, and is expected to continue focusing on free-swimming schools in order to increase the proportion of yellowfin tuna and the average size of fish in its catch.

In the first quarter of 2004 there were 99 active Hawaii-based longline vessels that made 332 trips, completed 3,446 sets (fishing days), and set 7 million hooks. All trips targeted tunas. Fifty-one percent of the hooks were set on the high seas and 33% were set in the main Hawaiian Island EEZ. In the first quarter of 2004 the Hawaii-based longline fishery caught 29,988 bigeye tuna, 20,793 mahimahi, and 17,376 pomfrets. In the remainder of 2004 most of the longline fleet is expected to target large tunas. However, the opening of a specially permitted longline fishery using techniques to reduce sea turtle interactions has allowed targeting of swordfish since April.

Twenty-seven American Samoa longline vessels made 111 trips in the first quarter of 2004. These vessels made 785 sets and set 1.9 million hooks. Albacore was the dominant component of the catch (17,004 fish) and was followed by yellowfin tuna (5,187), skipjack tuna (2,930), and bigeye tuna (2,570). The American Samoa longline fishery is expected to continue targeting albacore in 2004.

The 2003-2004 fishing season for the U.S. distant-water troll fleet for albacore has ended and 18 vessels (some non-U.S. flagged) participated in the fishery. The preliminary catch estimate for this season is 1,450 t.

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Table 1. U.S. catches (metric tons) by gear type in the western-central Pacific Ocean, 1999-2003.

Gear type	1999	2000	2001	2002	2003*
Purse seine	182,485	125,351	115,524	119,158	87,994
Longline	15,080	13,907	12,703	16,243	14,726
Distant water troll	1,339	2,433	2,105	1,220	1,184
Troll and handline	3,280	2,827	2,970	2,596	2,098
Pole-and-line	594	321	449	306	459
Total catch – all gears	202,778	144,839	133,751	139,523	106,461

\*Preliminary values.

Table 2. U.S. catches by species group in the western-central Pacific Ocean, 1999-2003.

Species	1999	2000	2001	2002	2003*
Skipjack tuna	130,272	81,124	86,687	88,049	64,418
Yellowfin tuna	36,558	35,787	25,620	30,315	23,999
Bigeye tuna	21,668	14,713	9,338	8,545	6,663
Albacore	3,547	4,118	6,871	7,923	5,718
Marlins	1,352	946	1,249	970	1,422
Swordfish	4,417	4,823	1,970	1,530	1,965
Sharks	2,867	1,506	157	179	159
Other pelagics	2,097	1,822	1,859	2,012	2,117
Total	202,778	144,839	133,751	139,523	106,461

\*Preliminary values.

Table 3. Number of vessels and catches (metric tons) by species for the U.S. tuna purse seine fishery in the western-central Pacific Ocean, 1999-2003. Values include discards and Cannery rejects and have been corrected for mixing of Bigeye tuna in yellowfin tuna landings.

	1999	2000	2001	2002	2003*
Vessels:	36	33	32	29	26
Catch by Species:					
Skipjack tuna	129,262	80,272	85,436	87,029	63,414
Yellowfin tuna	34,529	33,379	23,496	28,621	21,952
Bigeye tuna	18,694	11,700	6,592	3,508	2,628
Total catch:	182,485	125,351	115,524	119,158	87,994

\*Preliminary values

Table 4a. Number of vessels and catches (metric tons) by species for U.S. longline fisheries in the western-central Pacific Ocean, 1999-2003. Values do not include discards. California and Hawaii longline catches include those made east of 150°W.

	California and Hawaii					American Samoa					Other Pacific Islands					Total U.S. Longline				
	1999	2000	2001	2002	2003*	1999	2000	2001	2002	2003*	1999	2000	2001	2002	2003*	1999	2000	2001	2002	2003*
Vessels:	130	129	125	123	129	29	37	62	58	49	3	4	5	1	0	162	170	192	182	178
Species:																				
Albacore	1,540	941	1,293	525	524	338	624	3,253	5,944	3,925	0	0	27	0	0	1,878	1,565	4,573	6,469	4,449
Bigeye	2,820	2,706	2,418	4,396	3,618	9	21	74	196	242	48	79	21	3	0	2,877	2,806	2,513	4,595	3,860
Bluefin	55	19	6	2	0	0	0	0	0	0	0	0	0	0	0	55	19	6	2	0
Skipjack	99	93	211	127	207	25	14	60	231	114	0	0	0	0	0	124	107	271	358	321
Yellowfin	477	1,137	1,016	572	809	64	86	183	484	496	60	88	31	6	0	601	1,311	1,230	1,062	1,305
Other tunas	11	0	0	0	0	0	0	0	0	1	23	70	23	2	0	34	70	23	2	1
Blue marlin	357	314	399	264	363	16	22	16	34	11	0	0	0	0	0	373	336	415	298	374
Striped marlin	364	200	351	226	538	2	0	5	2	4	0	0	0	0	0	366	200	356	228	542
Spearfish	214	123	120	136	236	1	0	1	1	2	0	0	0	0	0	215	123	121	137	238
Black marlin	0	0	0	0	2	3	2	1	1	2	0	0	0	0	0	3	2	1	1	4
Sailfish	0	0	0	0	10	3	1	2	3	3	0	0	0	0	0	3	1	2	3	13
Other marlins	28	29	16	24	0	0	0	0	0	0	0	0	0	0	0	28	29	16	24	0
Swordfish	4,417	4,822	1,968	1,524	1,958	0	1	2	6	7	0	0	0	0	0	4,417	4,823	1,970	1,530	1,965
Blue shark	2,381	1,250	28	30	16	0	0	0	0	0	0	0	0	0	0	2,381	1,250	28	30	16
Mako	116	81	71	84	90	0	0	0	0	0	0	0	0	0	0	116	81	71	84	90
Common thresher	187	97	50	45	48	0	0	0	0	0	0	0	0	0	0	187	97	50	45	48
Bigeye thresher	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Pelagic thresher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other sharks	170	74	6	17	5	13	4	1	3	0	0	0	0	0	0	183	78	7	20	5
Mahimahi	325	368	254	289	307	16	19	34	39	36	0	0	0	0	0	341	387	288	328	343
Moonfish	551	318	345	415	497	3	3	4	3	4	0	0	0	0	0	554	321	349	418	501
Wahoo	156	111	176	135	126	22	21	49	162	194	0	0	0	0	0	178	132	225	297	320
Pomfrets	142	117	116	211	189	0	0	1	1	1	0	0	0	0	0	142	117	117	212	190
Oilfish	14	40	55	86	126	0	0	1	0	1	0	0	0	0	0	14	40	56	86	127
Escolar	1	5	3	2	2						0	0	0	0	0	1	5	3	2	2
Barracuda	0	0	0	0	9	1	2	1	1	1	0	0	0	0	0	1	2	1	1	10
Other pelagics	7	5	9	10	1	1	0	1	1	1	0	0	0	0	0	8	5	10	11	2
Total catch:	14,432	12,850	8,912	9,120	9,681	517	820	3,689	7,112	5,045	131	237	102	11	0	15,080	13,907	12,703	16,243	14,726

\*Preliminary values.

Table 4b. Summary of corrections applied to annual catch estimates for blue marlin and striped marlin in the Hawaii-based longline fishery. Corrections are based on estimated magnitude of logbook reporting error arising from species misidentification (Walsh, in review).

Year	Species	Nominal catch (t)	Reporting error (%)	Corrected catch (t)	Correction (t)
1999	Blue marlin	357	63.1	219	-138
	Striped marlin	364	-4.7	382	18
2000	Blue marlin	314	0.5	312	-2
	Striped marlin	200	-6.3	213	13
2001	Blue marlin	399	37.5	290	-109
	Striped marlin	351	-10.3	391	40
1999-2001	Blue marlin	1070	32.4	821	-249
	Striped marlin	915	-7.1	984	69

Table 5. Number of vessels and catch (metric tons) for the U.S. distant-water albacore troll fishery in the western-central Pacific Ocean, 1998-1999 to 2002-2003 fishing seasons. Values for the most current year are preliminary.

By Year:	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>
Vessels	21	36	33	12	14
Catch	1,339	2,433	2,105	1,220	1,184
By Season:	<u>1998-1999</u>	<u>1999-2000</u>	<u>2000-2001</u>	<u>2001-2002</u>	<u>2002-2003</u>
Catch	1,241	2,562	2,128	1,218	1,205

Table 6. Number of vessels and catch (metric tons) by species for the U.S. small scale and artisanal troll and handline fisheries that operate within the EEZs of Hawaii, American Samoa, Guam, and Northern Marianas, 1999-2003.

	Hawaii					Guam					CNMI					American Samoa					Total				
	1999	2000	2001	2002	2003*	1999	2000	2001	2002	2003*	1999	2000	2001	2002	2003*	1999	2000	2001	2002	2003*	1999	2000	2001	2002	2003*
Vessels:	1,906	1,695	1,702	1,615	1,650	449	416	375	375	371	106	113	113	90	73	36	19	19	16	20	2,497	2,243	2,209	2,096	2,114
Catch by Species:																									
Skipjack tuna	184	91	114	96	78	54	121	151	80	83	48	206	261	177	77	16	7	7	5	9	302	425	533	358	247
Yellowfin tuna	1,344	1,058	846	598	673	58	35	27	20	31	11	1	16	7	12	5	2	3	5	3	1,418	1,096	892	630	719
Bigeye tuna	97	207	233	442	175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	207	233	442	175
Albacore	330	120	193	234	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	120	193	234	85
Other tunas	0	0	0	3	2	9	5	6	1	7	8	6	3	2	4	0	0	0	0	0	17	11	9	6	13
Blue marlin	295	197	278	204	177	37	39	15	24	30	2	5	1	0	1	0	0	0	0	1	334	241	294	228	209
Striped marlin	29	14	44	29	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	14	44	29	29
Other billfish	0	0	0	21	13	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	22	13
Mahimahi	282	374	300	340	293	73	39	83	78	38	6	27	28	17	3	1	0	0	0	1	362	440	411	435	335
Wahoo	278	193	249	164	213	35	32	54	33	29	4	5	8	3	4	0	0	0	0	0	317	230	311	200	246
Other pelagics	51	32	41	5	13	19	8	7	4	12	2	2	1	3	2	1	1	1	0	0	73	43	50	12	27
Total catch:	2,890	2,286	2,298	2,136	1,751	286	279	343	241	230	81	252	318	209	103	23	10	11	10	14	3,280	2,827	2,970	2,596	2,098

\*Preliminary values.

Table 7. Number of vessels and tuna catch (metric tons) for the U.S. pole-and-line fishery in the western-central Pacific, 1999-2003.

Year:	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003*</u>
Vessels:	7	7	6	6	6
Catch by Species:					
Skipjack tuna	584	320	447	304	436
Yellowfin tuna	10	1	2	2	23
Total catch:	594	321	449	306	459

\*Preliminary values.

Table 8. Bycatch of U.S. purse seine fishery in the central-western Pacific, 2003.

<b>Species</b>	<b>Metric tons</b>
<b>Tuna discards</b>	
Skipjack tuna	564.7
Yellowfin tuna	91.1
Skipjack/yellowfin tuna	90.5
<b>Bycatch</b>	
<b>Other tunas/tuna-like:</b>	<b>1.9</b>
Albacore	1.8
Wahoo	0.1
<b>Billfish:</b>	<b>9.5</b>
Black marlin	0.9
Blue marlin	0.0
Marlin unspecified	8.1
Sailfish	0.5
<b>Sharks/rays:</b>	<b>57.9</b>
Shark unspecified	57.5
Rays, skates, mantas	0.4
<b>Other fish:</b>	<b>73.5</b>
Amberjack	51.5
Baitfish	9.3
Barracuda	0.0
Mackerel	4.0
Mahimahi	0.3
Triggerfish	1.6
Rainbow runner	0.1
Marlin and shark	6.5
Other unspecified fish	0.2
<b>Total bycatch:</b>	<b>889.0</b>



Table 9a. Logbook report of fish bycatch (in number of fish and percent of total catch) from the California and Hawaii-based longline fisheries and the American Samoa-based longline fishery, 2003.

Species	California and Hawaii		American Samoa	
	Number discarded	Percent discarded	Number discarded	Percent discarded
<b>Tunas:</b>	<b>17,532</b>	<b>9.0</b>	<b>14,535</b>	<b>4.6</b>
Albacore	2,290	9.3	50	0.0
Bigeye tuna	4,322	4.0	1,240	7.7
Bluefin tuna	12	17.6	7	7.8
Skipjack tuna	9,146	27.9	11,731	28.3
Yellowfin tuna	1,444	5.1	1,507	5.0
Other tunas	318	58.2	0	0.0
<b>Billfish:</b>	<b>5,304</b>	<b>7.3</b>	<b>3,798</b>	<b>83.9</b>
Black marlin	0	0.0	30	90.9
Blue marlin	87	1.5	2,549	91.8
Sailfish	0	0.0	484	88.6
Shortbill spearfish	949	5.3	335	75.1
Striped marlin	853	3.3	210	71.9
Swordfish	3,390	15.0	190	43.7
Other marlins	25	4.5	0	0.0
<b>Other pelagic fish:</b>	<b>4,826</b>	<b>3.4</b>	<b>15,581</b>	<b>45.6</b>
Barracuda	0	0.0	0	0.0
Mahimahi	2,075	3.7	2,333	37.6
Molas	0	0.0	0	0.0
Oilfishes	428	2.4	7,197	98.6
Opah	136	1.1	773	80.8
Pomfrets	485	1.4	906	77.1
Wahoo	196	1.1	1,797	11.3
Other	1,506	58.6	2,575	98.6
<b>Sharks:</b>	<b>70,473</b>	<b>88.3</b>	<b>10,787</b>	<b>98.7</b>
Blacktip shark	0	0.0	0	0.0
Blue shark	66,246	92.6	7,733	98.9
Hammerhead sharks	0	0.0	0	0.0
Mako sharks	992	45.4	346	98.9
Oceanic whitetip shark	0	0.0	1,934	98.5
Silky shark	0	0.0	0	0.0
Thresher sharks	2,917	83.6	379	97.2
Other sharks	318	12.5	395	99.2
<b>Total fish bycatch:</b>	<b>98,135</b>	<b>20.6</b>	<b>44,701</b>	<b>12.1</b>

Table 9b. Estimated total incidental takes of protected species in the Hawaii-based longline fishery for 2003 based on analysis of NMFS observer data and logbook effort statistics.

<b>Species</b>	<b>Estimated Take in 2003</b>
<u><i>Sea turtles</i></u>	
Loggerhead	0
Leatherback	4
Olive Ridley	14
Green turtle	0
<u><i>Albatrosses</i></u>	
Black-footed	111
Laysan	146
<u><i>Dolphins</i></u>	
Spotter	0
Spinner	0
Bottlenose	4
Risso	0
<u><i>Whales</i></u>	
Pilot	0
Humpback	0
False killer	7
Sperm	0
Beaked	0
Unidentified	4

Figure 1. Distribution of fishing effort (days fished) for the U.S. tuna purse seine fishery in the western-central Pacific Ocean, 2003.

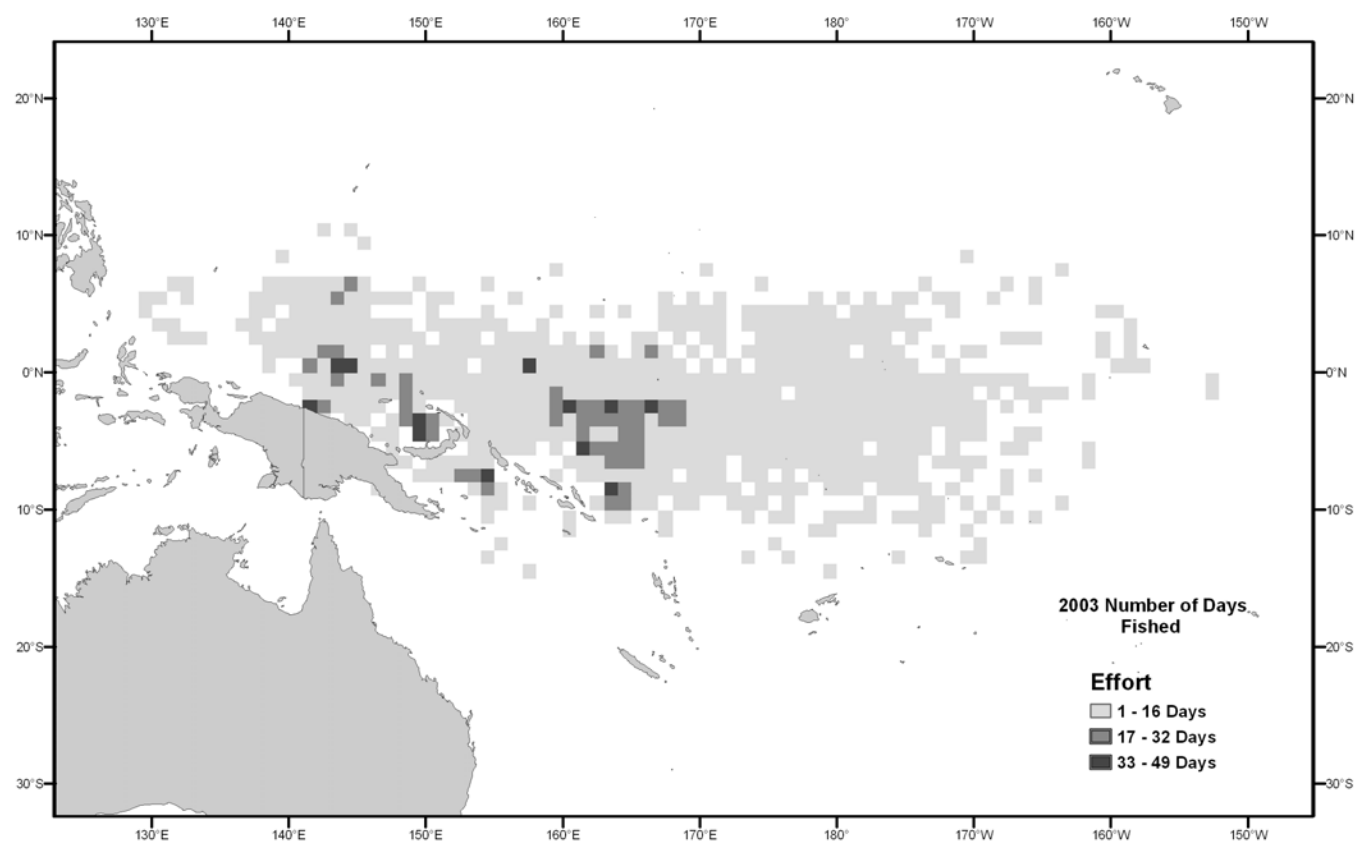


Figure 2. Frequency of different types of U.S. tuna purse seine sets in the western-central Pacific Ocean, 1999-2003.

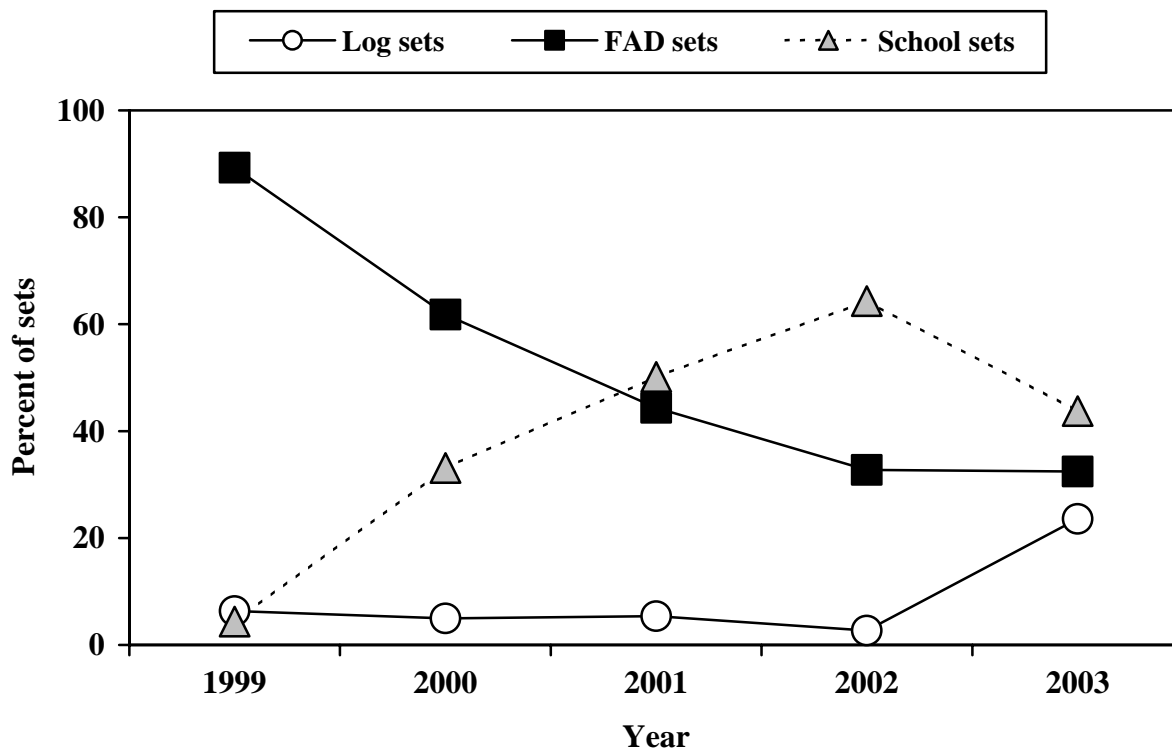
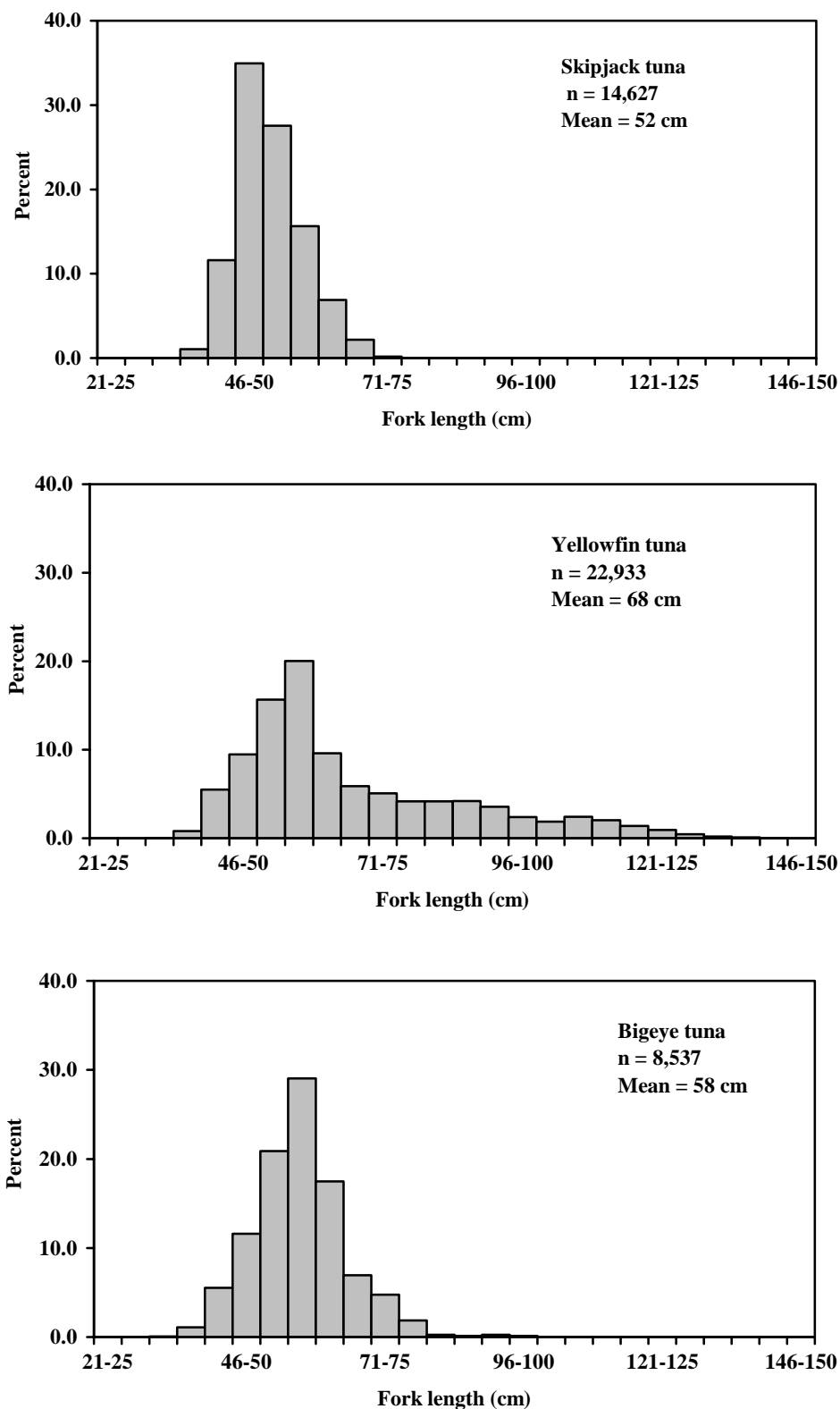


Figure 3. Length frequency histograms of skipjack, yellowfin, and bigeye tunas landed by U.S. purse seiners in the western-central Pacific Ocean, 2003.



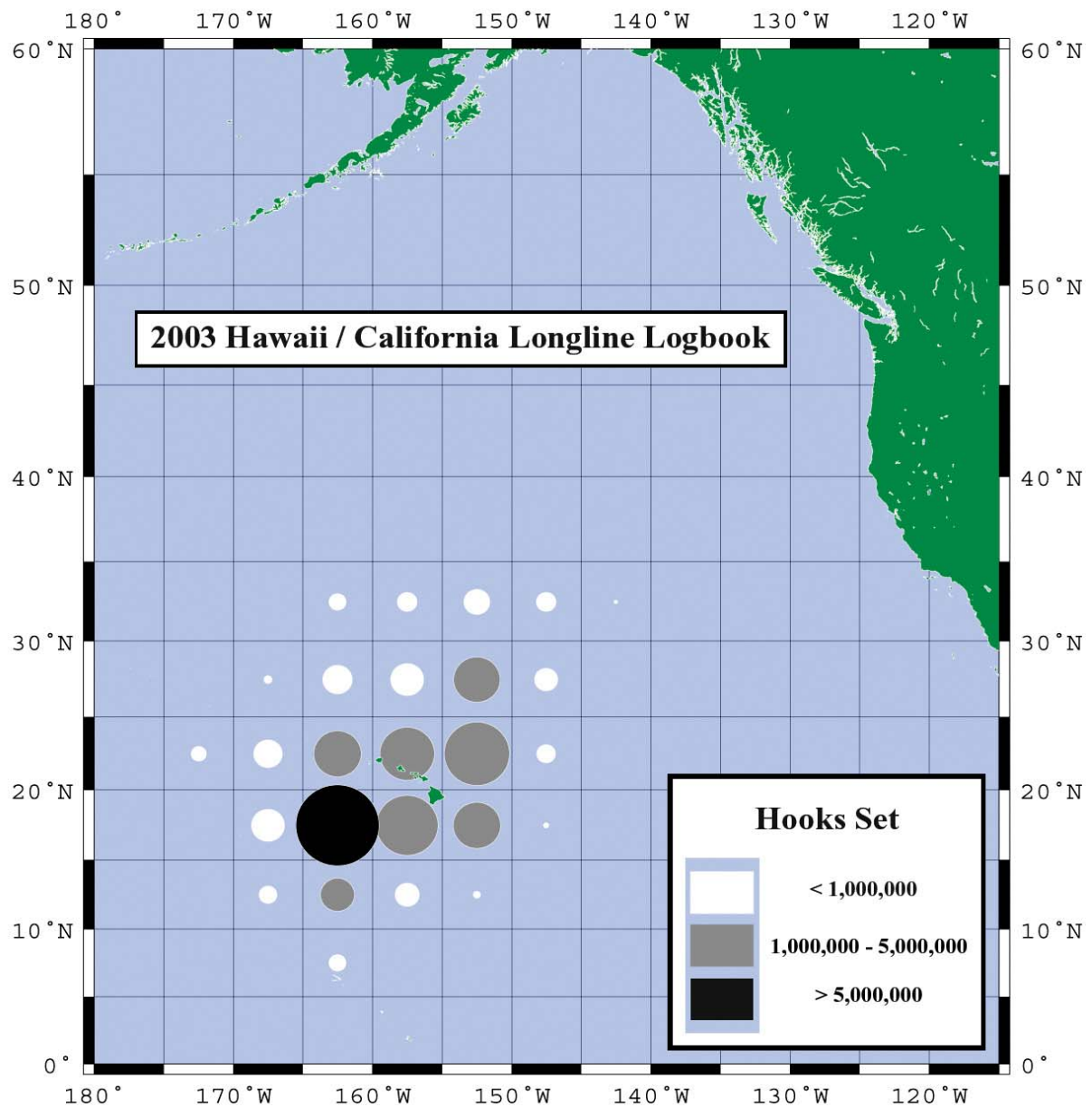


Figure 4. Distribution of nominal fishing effort (number of hooks fished) by Hawaii- and California-based longline vessels in 2003. Derived from non-confidential summary data.

Figure 5a. Weight frequency distribution of bigeye tuna and yellowfin tuna catch by the Hawaii-based longline fishery, 2003.

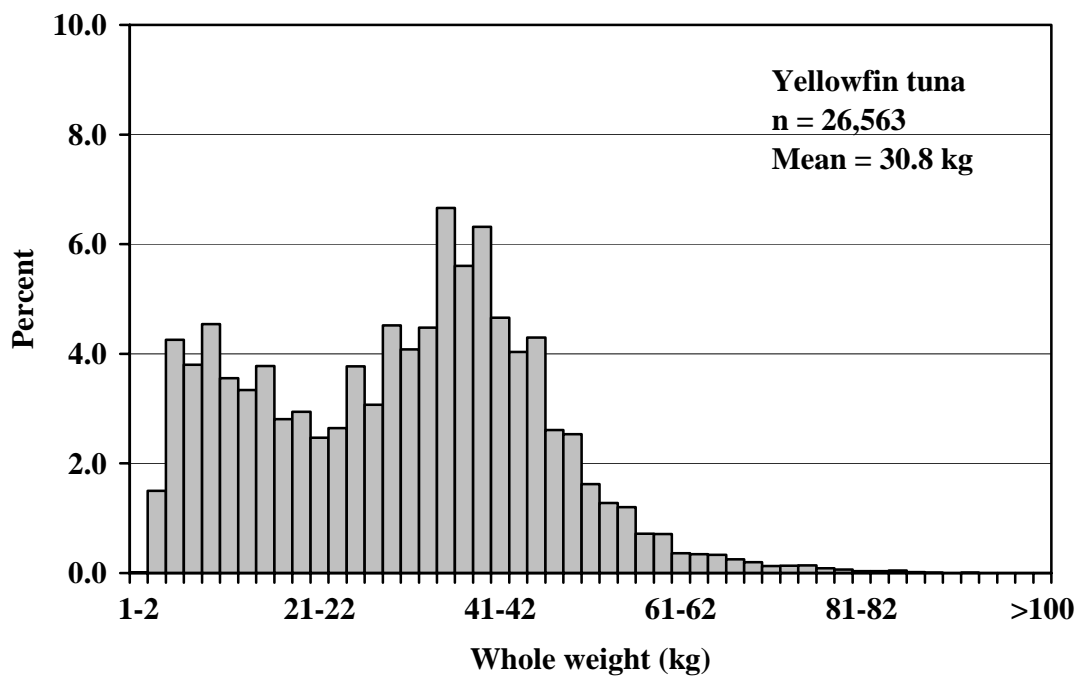
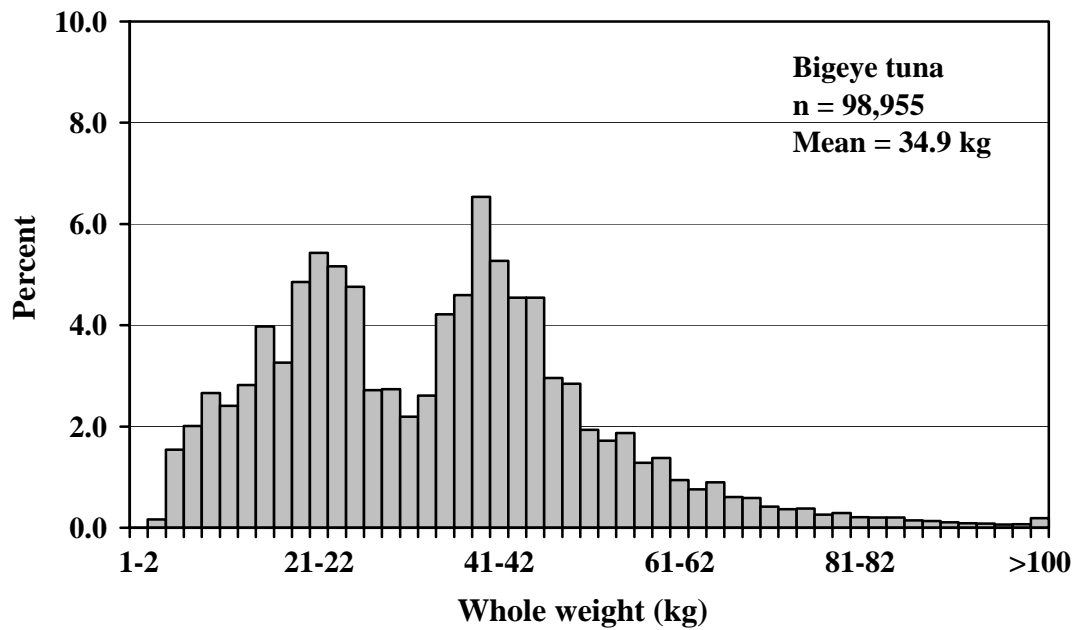


Figure 5b. Weight frequency distribution of albacore and swordfish catch by the Hawaii-based longline fishery, 2003.

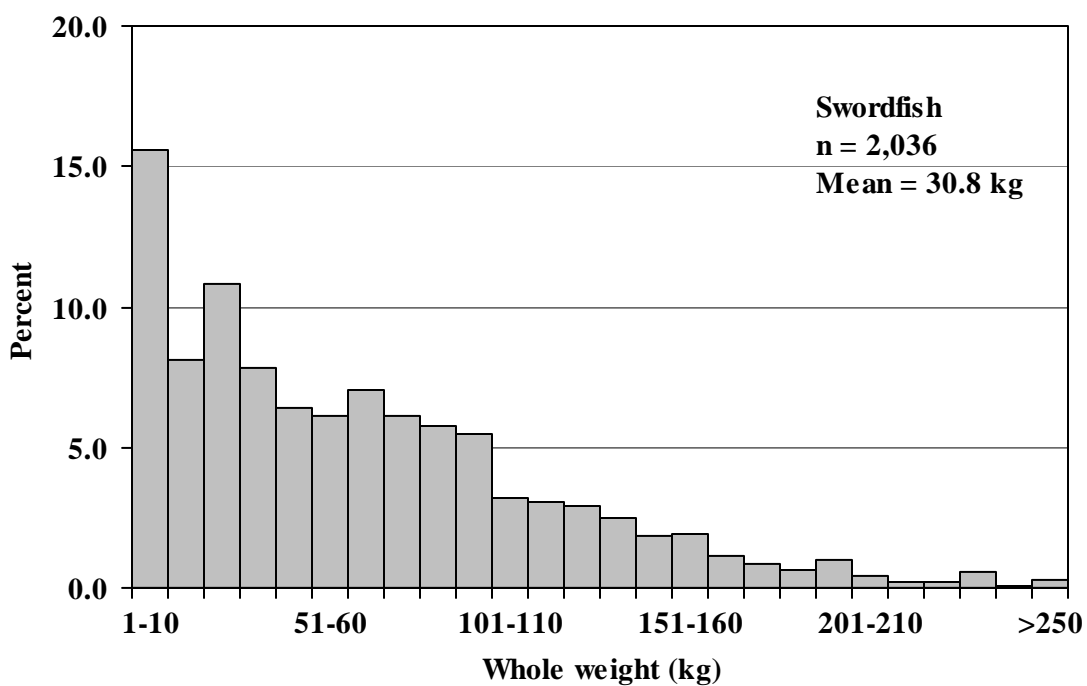
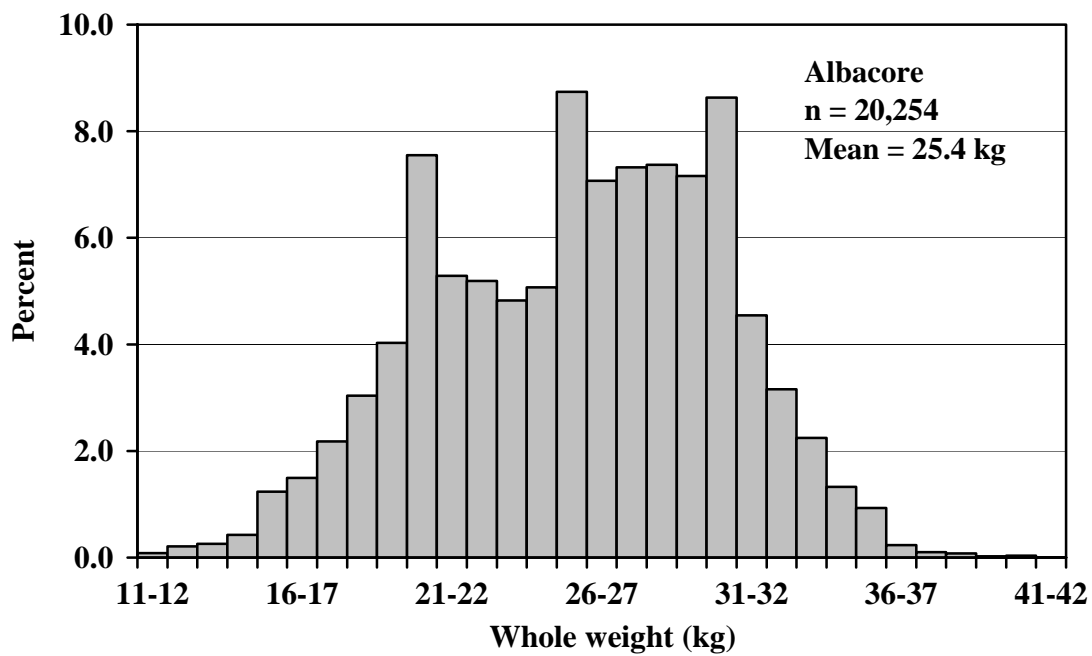




Figure 6. Length frequency distributions of albacore and yellowfin tuna landings by the American Samoa longline fishery, 2003.

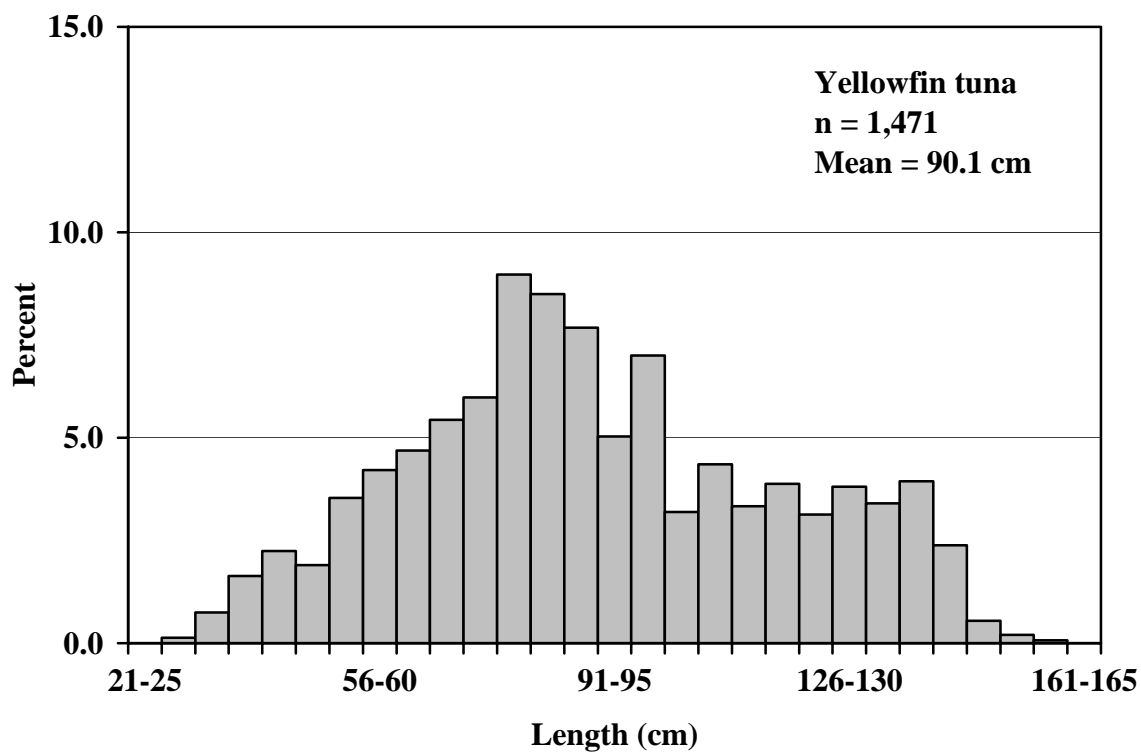
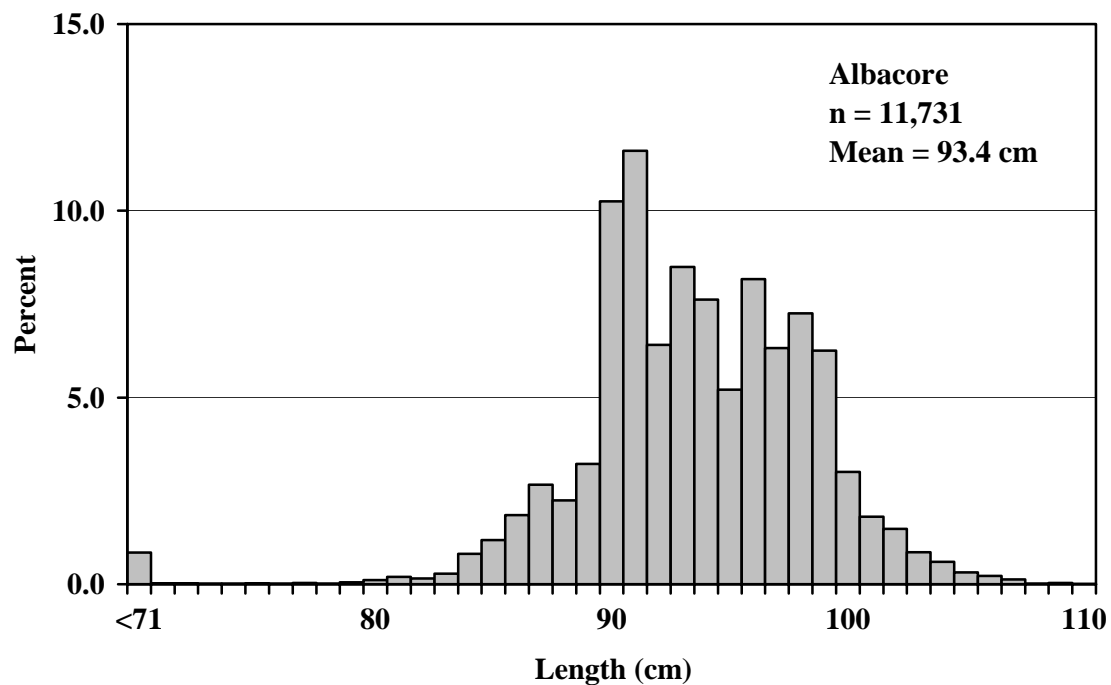


Figure 7. Distribution of effort (in number of days fished) for the distant-water troll fishery, 2002-2003 season.

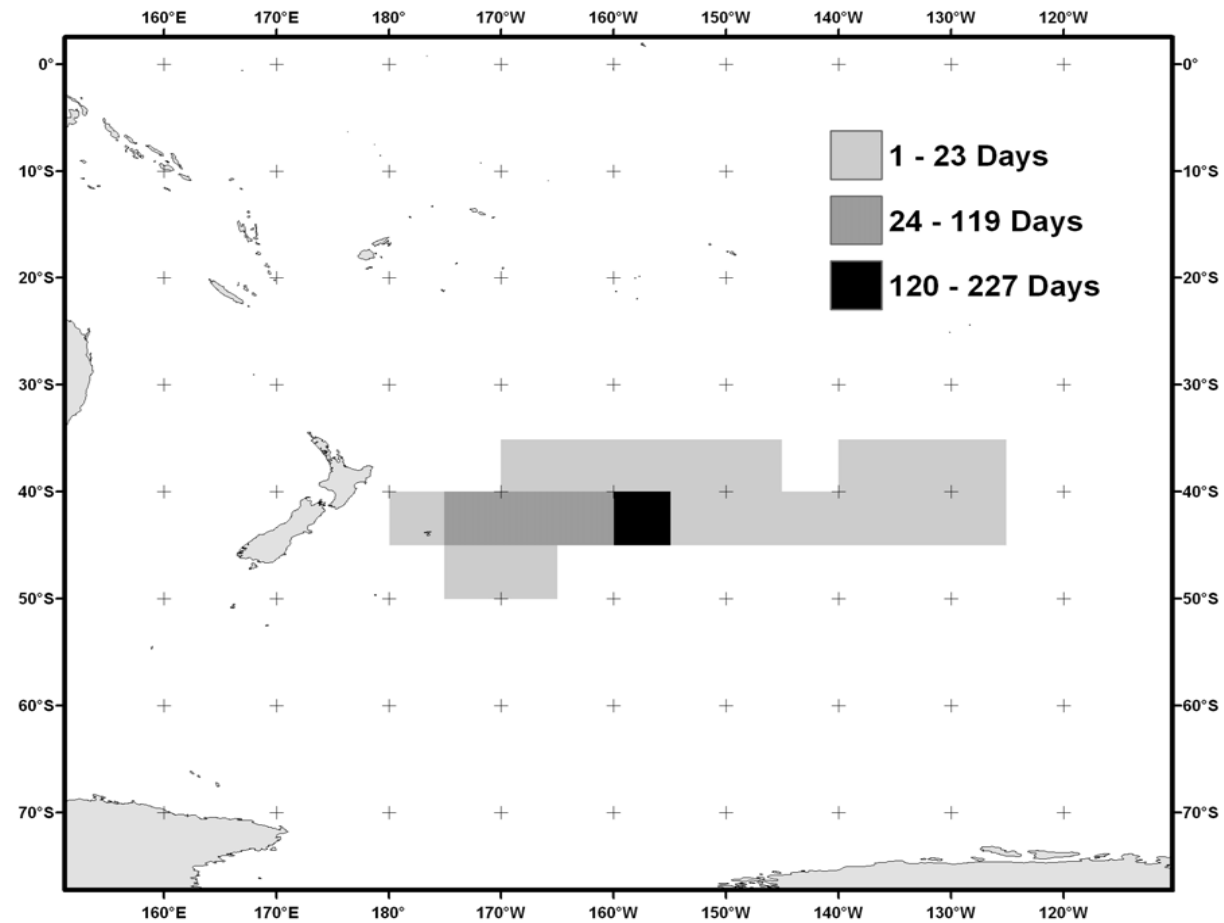


Figure 8. Length frequency of albacore landings by the distant water troll fishery, 2002-2003.

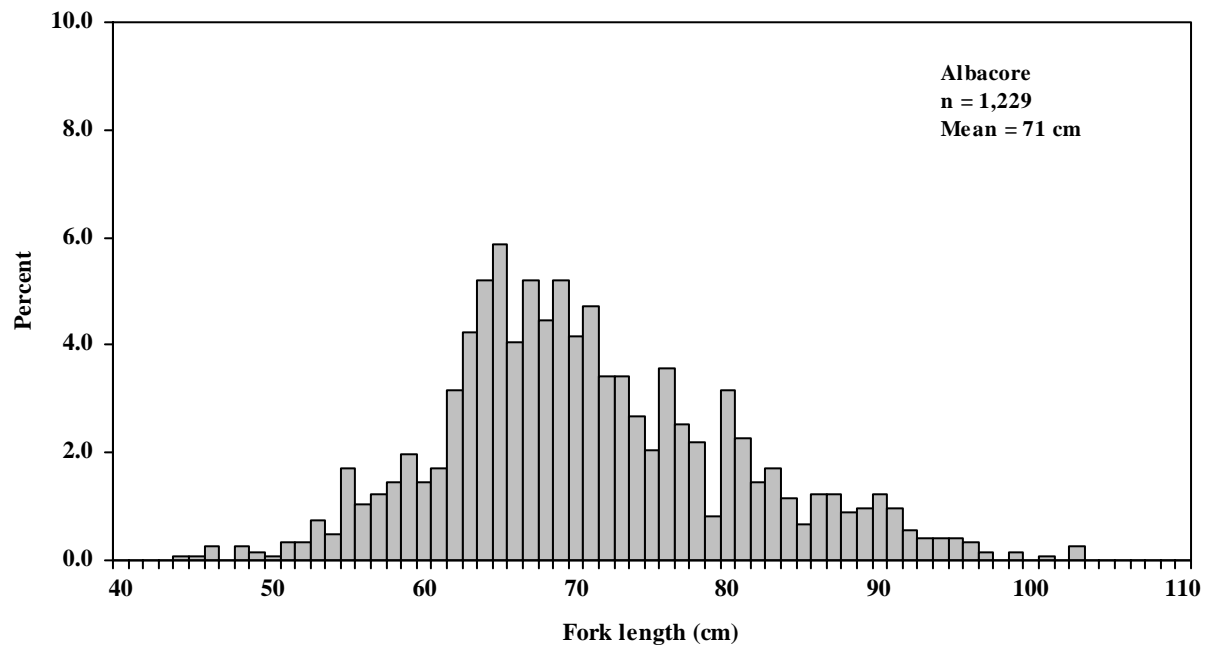


Figure 9. Length frequency distributions of yellowfin tuna and skipjack tuna landed by the Hawaii troll and handline fishery, 2003.

